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Building Your Baby From The Ground Up: In Defense of Free-Range and Baby-Led Movement

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At birth, babies begin a developmental journey that transforms them from immobile infants to bipedal toddlers typically within 12 to 18 months. During this crucial window of time, babies learn to move in innate ways and in a natural sequence that evolution has refined in order to optimize the development of neuromotor coordination.[1-4]

In the first 3 months, you'll see them move, struggle, turn their heads, and even attempt to lift their heads. From 3 to 9 months, you'll see them prop themselves up on their elbows, roll, and move to a crawling position. Between 9 and 15 months, they will independently sit, stand, 'cruise' while holding onto objects, take their first steps, and walk. By 18 months, they will have established the stability, coordination, strength, and mobility that will be the foundation for their biomechanical future.[1-3]

These movements will happen completely naturally, without assistance, if the baby is allowed to develop normally. From birth, babies experiment with how to move and use their bodies. This is how they learn—by trying, testing, and sometimes failing, then trying again. They don't need to be taught how to move, turn over, crawl, or walk. In a natural environment—one free from modern technological devices and toys—typically-developing infants figure out how to do that all on their own.

Infants are neurologically primed to develop movement patterns like sitting, crawling, and walking as the result of a complex neurosensorimotor process that evolution has honed over millennia.[4] Babies don't need technological intervention to succeed in this process, and as much as parents and others want to "help," babies do not need caretaker assistance in their motor development. In fact, as you will see, such assistance could even interfere with the healthy progression of this development.

The question is, what can we, as caretakers, do to best support rather than inhibit infants on this significant developmental journey? How can we create an ideal environment in which they can reach, move, and grow during the first 18 months of their lives?

That is the question that Building Your Baby From the Ground Up seeks to answer for parents, caregivers, and clinicians around the world.

A Minimalistic Evolutionary Model of Baby-Led Development

When infants spend time on their backs and on their stomachs, they benefit from the opportunity to move naturally—and that alone propels them to eventually crawl, sit, and walk. It is in this

process of moving in reaction to the sensory input of being on the floor that catalyzes appropriate coordination of movement and muscular co-activation. Without each link, occurring in sequence, the chain of motor development becomes skewed, and altered patterns are more likely to occur.[12-15]

In modern Western and first-world societies, however, babies are less likely to inhabit the natural environments they once did prior to technological inventions designed to foster mobility. "Assistance" devices, such as walkers, actually interfere with the natural process of motor development, and can hinder healthy physicality for life.[23]

The mission of Building Your Baby From the Ground Up is to equip parents, caretakers, daycare providers, and clinicians with actionable steps for helping infants around the world to move and develop naturally.

The core tenant is that a minimalistic evolutionary model is superior to any device, and that parents and caregivers can intervene in a beneficial rather than detrimental way by following this program and avoiding all devices or assistance that hinder or alter natural movement.

Therefore, unless a baby can get into a position or movement completely on their own—like sitting up or walking on two feet—they should not artificially experience this position through the aid of a device or assistance.

If a child artificially experiences a position before they are able to perform it on their own, their own physiologic and developmental processes may respond in an altered fashion. And we are seeing these changes and aberrant developmental patterns from a clinical perspective. There is no official diagnosis for dysfunctional and altered movement patterns due to time spent in these infant orthotic devices, but the term "Container Baby Syndrome" is being used to broadly describe the group of symptoms and findings observed.[16]

Our recommendations are guided by developmental kinesiology, human physiology, existing research, and clinical observations. To date, research has focused primarily on the effects of walkers on infant motor development. Here, the principles of those findings are extrapolated to include other pieces of equipment and assistance that provide artificial support to infants' limbs and spine. While additional research is needed to bring more attention and understanding to this important issue, here are tools that can be used right now to optimize a baby's physical development.

The Four Principles of Baby-Led Movement

1. Forgo all Infant Orthotic Devices (IODs).

Eliminate the use of infant orthotic devices, or IODs (like infant seats, walkers, exersaucers, or jumpers), at home and wherever your child spends time. Request that your caretakers and daycare facilities not utilize IODs for your child, and provide them resources to encourage them to eliminate their utilization altogether.

Infants do not need any devices, including floor seats, jumpers, exersaucers, pillows, walkers, curved bassinets, or push devices. Such devices can be called infant orthotic devices, or IODs. Many people believe these devices help babies, but they are actually counterproductive for their developing bodies.

When a child lies down, sits, jumps, or walks with the artificial support of a device, the child's motor patterns develop with dependencies, and perhaps deficiencies, that could affect their

future movement and comfort in their bodies. Research shows that infant walkers in particular could cause developmental delays and altered motor patterns. [5-11]

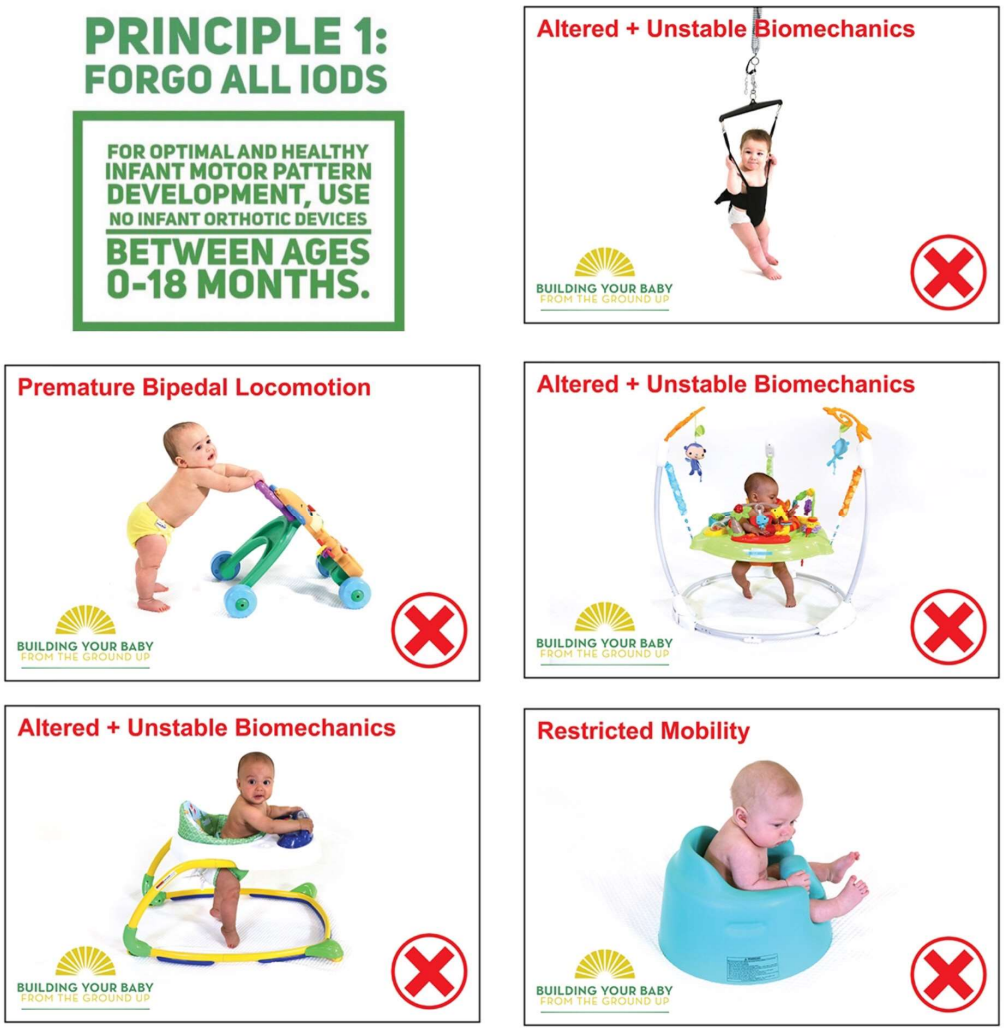
Evidence against the use of Infant Orthotic Devices (specifically walkers):

- "… babywalkers are associated with delay in achieving normal locomotor milestones … The use of babywalkers should be discouraged." (Garrett, 2002, p. 1494)[5]
- "... usage … can delay the acquisition of independent walking and disturb the normal gait pattern in normal children so it is highly recommended stopping baby walker usage and educate parents and health professionals about its hazards." (Shafeek, 2016, p. 81)[6]
- "A disharmonic and delayed motor development, contractures of the calf muscles and motor development mimicking spastic diplegia are considered to be caused by the early use of infant walkers." (Engelbert, 1999, p. 273) [7]
- "…for some infants the excessive use of babywalkers alters the pathway of normal locomotor development." (Crouchman, 2008, p 761) [8]
- "Current data available in the literature is not enough to prohibit using baby walker[s]; however, it suggests no advantage of the walkers in child development. This issue must be noticed more by researchers … " (Badihian, 2001, p. 5) [9]
- "Because data indicate a considerable risk of major and minor injury and even death from the use of infant walkers, and because there is no clear benefit from their use, the American Academy of Pediatrics recommends a ban on the manufacture and sale of mobile infant walkers." (American Academy of Pediatrics, 2001, p. 790) [10]
- "No equipment enhances a child's motor development … " (Deardorff, 2012) [11]

Nevertheless, manufacturers of infant orthotic devices continue to make widely-accepted claims that such devices benefit infants by "helping" them learn to sit and walk.

For optimal healthy infant motor pattern development, we strongly suggest foregoing infant orthotic devices altogether, instead opting for free-range positions on the floor that encourage the most natural baby-led movements.

Figure A: Principle 1



2. Resist Caretaker Assisted Movements (CAMs).

Caretaker assisted movements, or CAMs, may delay or alter motor development similar to the use of infant orthotic devices. Resist the urge to "help" your child get into positions or perform movements they cannot do independently. Instead, let infants move on their own; they will attain new skills in their own time.

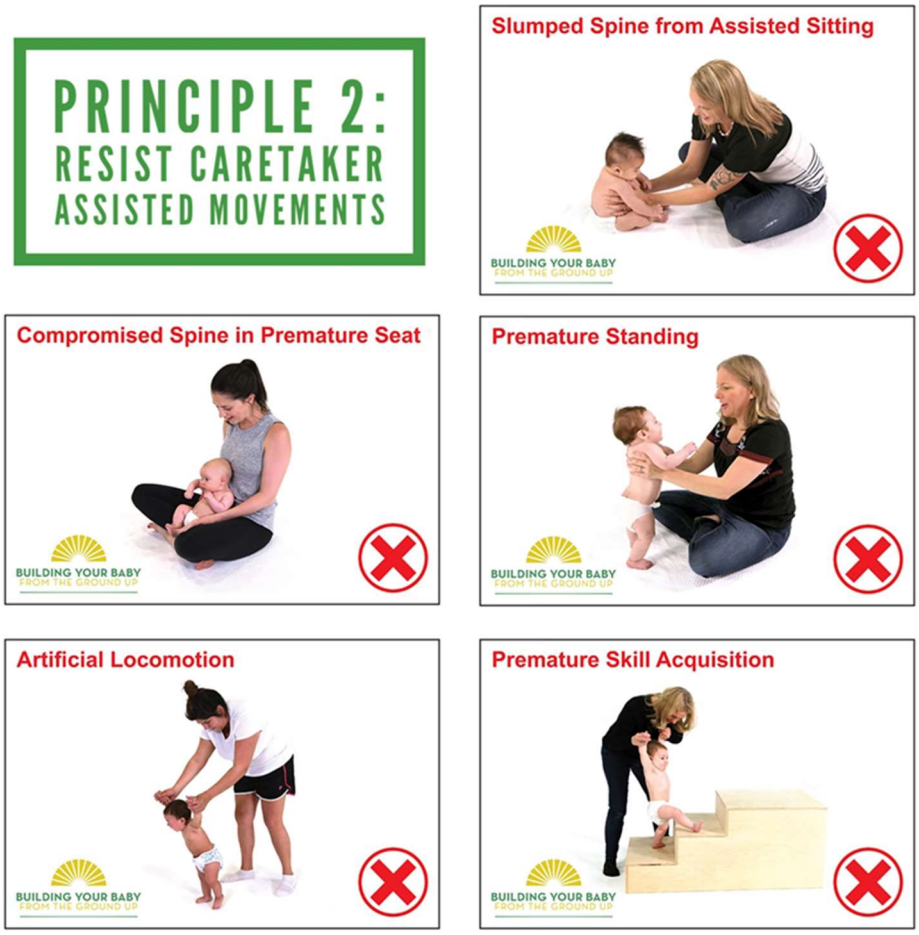
In addition to avoiding assistive devices, we also encourage caregivers to avoid physically assisting infants into positions or movements they cannot yet perform independently. Another term for this is caretaker assisted movements, or CAMs. Like IODs, caretaker assisted movements are common and understandable, but not in a baby's best interest.

Loving caretakers, eager to see their infants succeed, may think they are being helpful by placing developing infants into positions that they are not yet ready to perform, like sitting, crawling, standing, or walking. In effect, when caregivers do this, they are acting as an assistive device. When adults try to "help" them in this way, they may actually be limiting the infant's progression. A caretaker can best help a developing infant by letting baby lead the way and attain developmental milestones on their own, without artificial physical support from an adult.

Key reasons to avoid Caretaker Assisted Movements:

- As with infant orthotic devices (IODs), caretaker assisted movements may prematurely develop an infant's motor patterns and may delay or alter their future coordination, strength, and mobility.
- CAMs may give baby a false sense of their own capabilities that could embolden them to take movement risks for which they are not yet primed.
- An infant may even seem to enjoy caretaker "help" by smiling or moving in a way that a caretaker could interpret as the infant wanting to move in that way. This can mistakenly lead the adult to believe a baby's positive response means the movement is healthy.
- Adults may also think that a child needs to see the world from an upright perspective. However, infants are better suited for development—and can be just as happy—in their more developmentally appropriate horizontal position.
- Caretakers, can engage in baby-centric positions and activities to still interact while also encouraging their innate inclinations to move and learn. And it is these baby-led principles that show how to do just that.

Figure B: Principle 2



3. Get on the ground.

Begin using infant-centric engagement and baby-led activities so your baby can be in an optimal biomechanical position as often as possible. From here, infants can move, reach, grow, and develop naturally as they thrive from the ground up.

Instead of assisting in their achievement of milestones like crawling, sitting, and walking, caretakers would be more helpful to developing infants by engaging in baby-centric activities on the floor. Like skipping a chapter in a book, if we "help" a child perform an activity beyond their skill set, they may miss an important sequence of their developmental story. Instead, you can engage in that story directly by getting down on the floor with your baby.[15]

Benefits of this baby-led development approach include:

- Babies will be more at ease in natural positions from early on in development.
- Babies will have the opportunity to develop holistic motor control that will establish their foundation and can build incremental coordination and strength when the time is right.
- Babies will develop appropriate coordination, stability, and mobility of all portions of the biomechanical system, including the entire spine and cranium, diaphragm, pelvic floor, abdominal wall, and the upper and lower extremities.
- Babies will be primed to take next steps only when they are stable enough to do so, thus potentially avoiding movements beyond their capabilities. If infants can't do it on their own, we don't need to "help" them do it.
- Caretakers can be most helpful to developing infants by avoiding artificially supported locomotion altogether and adopting a baby-led movement paradigm that is respectful of their biomechanical abilities and limitations.

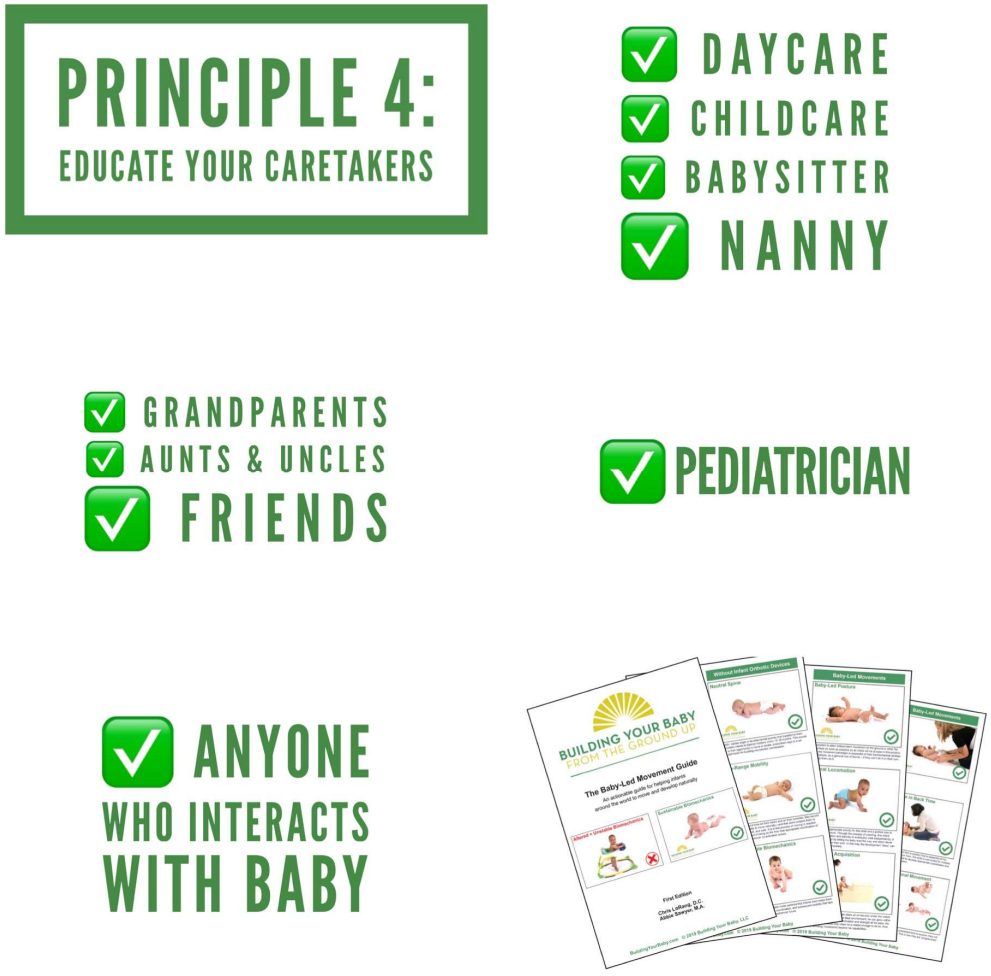
What we must remember is that motor development should be a gradual process. It takes a typical infant 12 to 18 months to be able to walk.[1,2] *Be patient! This is an opportunity to see and celebrate the micro-milestones, as well as the big ones, once the child has reached them on their own.*

Figure C: Principle 3

4. Educate your caretakers.

Give your baby the benefit of a nurturing developmental environment wherever they spend time. Find educational materials and shareable images throughout our website to engage your village of caretakers in this baby-led movement. Visit BuildingYourBaby.com for more details.

Figure D: Principle 4



Appendix A: Underlying Principles and Physiology of Developmental Kinesiology

The physiological development of bone, muscle, and the motor patterns that control involuntary and voluntary movements are the result of complex hormonal, sensory, and mechanical mechanisms.

Understanding how bones, soft tissue, and motor patterns develop according to somatosensory input helps us to better understand how altered movement results from utilization of infant orthotic devices and caretaker-assisted movements, and also helps us understand why free-range and baby-led movement is best.

On the development of bone:

Anatomist and surgeon Dr. Julius Wolf described that bone growth and remodeling occurs in response to the mechanical load and stresses that are placed upon them. Wolfe's Law is named after him to describe this process.

> "Wolf's law holds that a bone grows or remodels in response to the demands placed on it. The first thing to understand is that a bone's anatomy reflects the common stresses it encounters. For example, a bone is loaded (stressed) whenever weight bears down on it or muscles pull on it." (Marieb, 2016, p. 189) [17]

> "How do mechanical forces communicate with the cells responsible for remodeling? Deforming a bone produces an electrical current. Because compressed and stretched regions are oppositely charged, it has been suggested that electrical signals direct remodeling." (Marieb, 2016, p. 189) [17]

Bone development is a complex process and also relies on hormonal signaling for growth, but as Marieb suggests that "Mechanical stress determines *where* remodeling occurs."[17]

Dr. Harold Frost adapted Wolfe's Law and incorporated new scientific knowledge to develop the Mechanostat Theory and subsequently, the Utah Paradigm of Skeletal Physiology that is still evolving.[18]

On the development of soft-tissue:

In analogous fashion - muscles, tendons and ligaments develop, in part, because of the mechanical stressors that are placed upon them. What is now known as Davis' Law was perhaps the first to describe this phenomenon. And we now understand that soft tissue adapts and remodels in response to mechanical loads.[19]

> "Load-bearing collagenous soft tissues exhibit complex mechanical behaviors, but also a remarkable ability to adapt to perturbations in mechanical loading." (Cyron, 2016, p. 21)[19]

On developmental kinesiology, motor patterns, and learning:

The underlying neurodevelopmental models that guide this work and also encourage baby-led movement are informed by the work of Dr. Vaclav Vojta, Dr. Vladimir Kolar, Dr. Emmi Pikler, Marianne Hermsen-Van Wanrooy, and their academic descendants. [1-3, 22-23]

If experiencing positions or movements with artificial support, the child receives mechanical sensory input and their brain will begin to *learn* how to move and be in relation to that device/support instead of independently, with stability, coordination, and strength intact.

It is understood that the brain both executes preprogrammed motor patterns and reflexes, but also *learns* movement in response to the environment.

> "The functions of the motor cortex are controlled mainly by nerve signals from the somatosensory system but also, to some degree, from other sensory systems such as hearing and vision. Once the sensory information is received, the motor cortex operates in association with the basal ganglia and cerebellum to excite an appropriate course of motor action." (Hall, 2016, p. 710) [20]

> "When nerve signals from the motor cortex cause a muscle to contract, somatosensory signals return all the way from the activated region of the body to the neurons in the motor cortex that are initiating the action." (Hall, 2016, p. 712) [21]

From a biomechanical perspective, infant orthotic devices and caretaker assisted movements may place excess load upon the infant's developing anatomy — and because we understand that biomechanical forces and somatosensory input drive physiologic processes and motor pattern development, we may expect to see changes in developing anatomy and altered movement patterns.

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